

Dynamic Parking Pricing Simulation

Summer Analytics 2025 Capstone Project

Consulting & Analytics Club × Pathway

Prepared by: Sanjay Jangir

□ Project Overview & Approach

This project develops a real-time dynamic parking pricing system to optimize urban parking space utilization.

□ Objective:

- Adjust parking prices based on demand, traffic, queue length, special days, vehicle type, and competitor prices.
- Ensure smooth, fair, and explainable pricing.

⚙ Methodology:

1. Data Preprocessing:

- Merged date and time into timestamps.
- Normalized categorical variables.

2. Models Implemented:

- Baseline Linear Model:
Simple proportional price adjustment based on occupancy.
- Demand-Based Model:
Uses multiple factors to compute demand score and adjust price smoothly.
- Competitive Model:
Incorporates competitor prices from nearby locations to refine pricing.

3. Visualization Strategy:

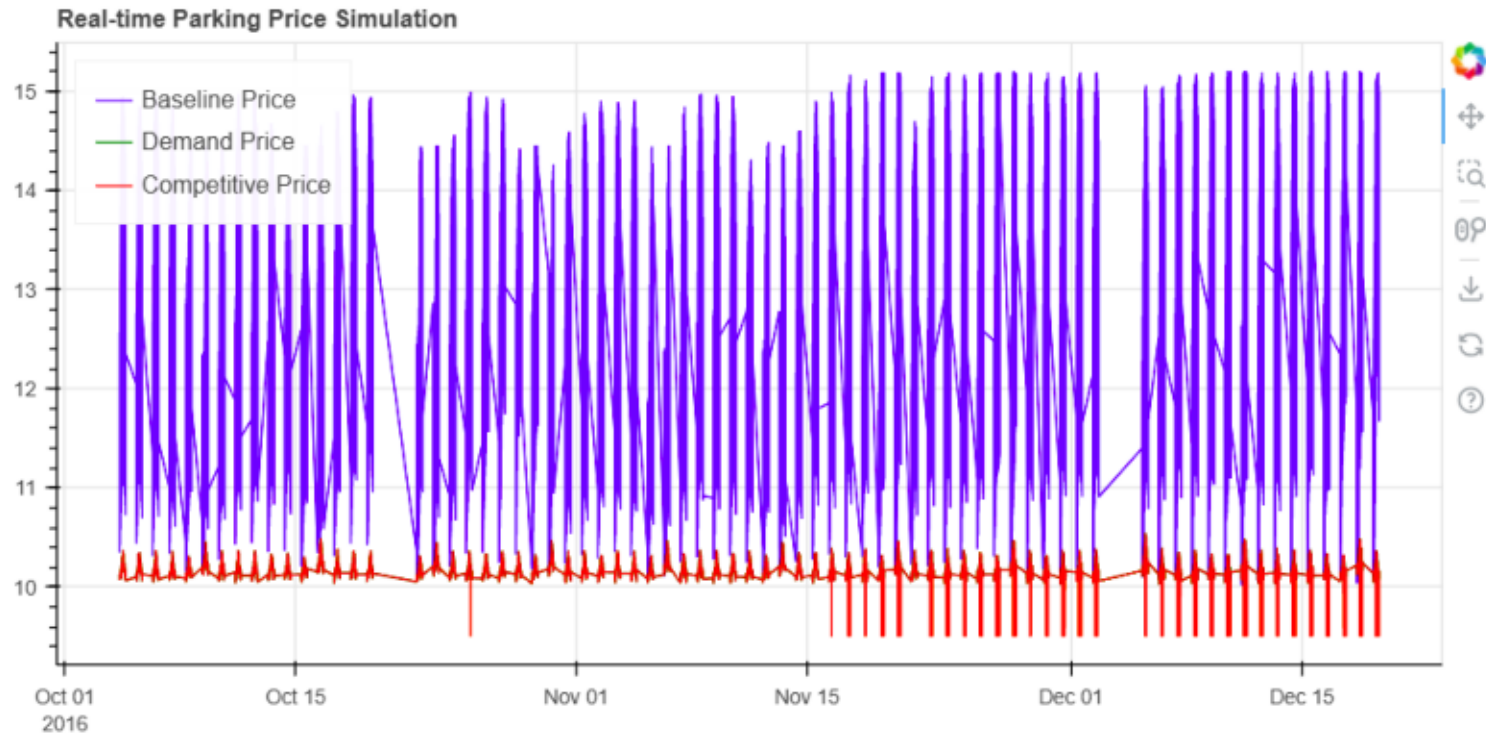
- Focused individual plots for Competitive and Demand Prices.
- Combined plot for all models to compare pricing behaviors.

□ Key Features:

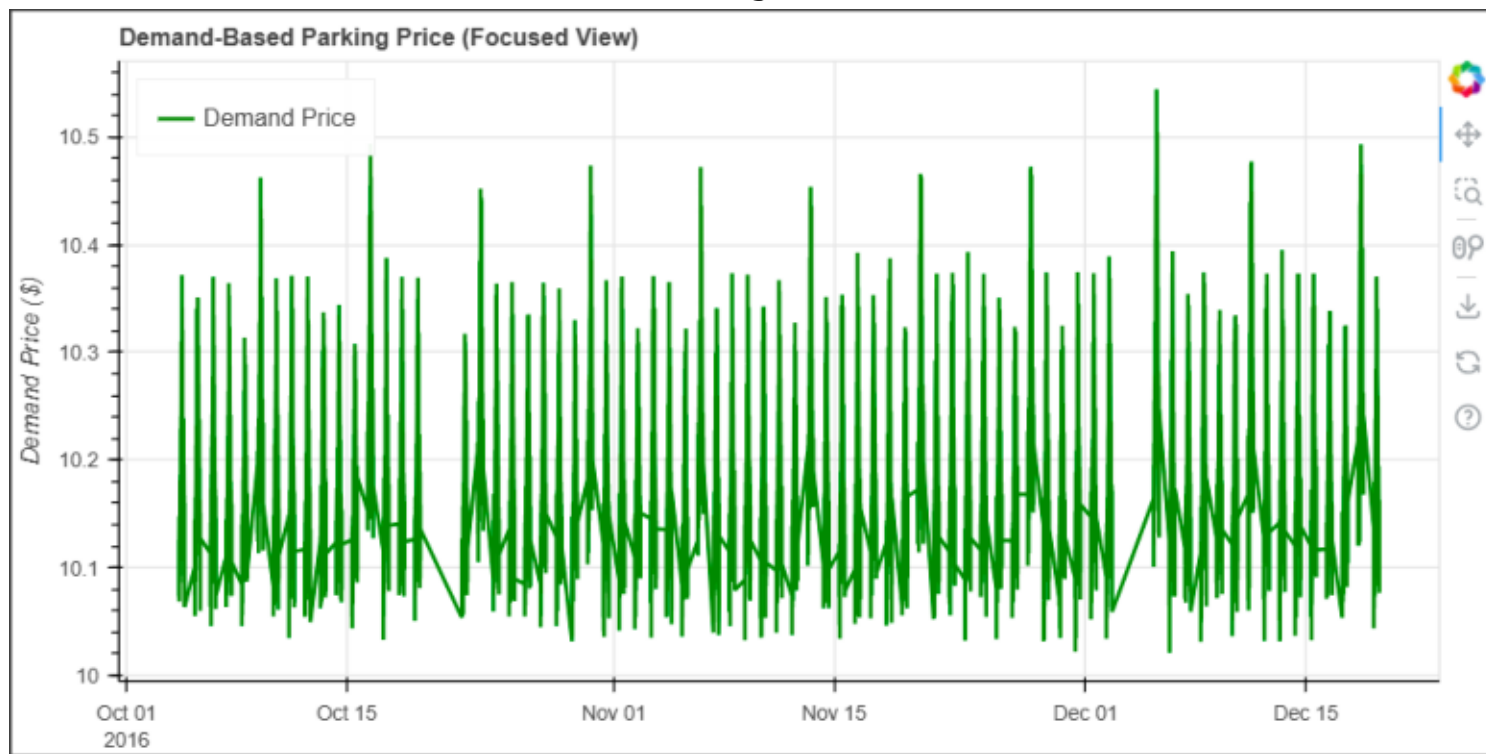
- Real-time simulation with continuous price updates.
- Smooth, bounded price variations.
- Clear visualizations to explain model behavior.

This solution can directly enhance smart urban parking systems.

Competitive-Based Parking Price (Focused View)



Demand-Based Parking Price (Focused View)



Real-time Parking Price Simulation (All Prices)

